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THE

SISTER ARTS,

OR

A concise and interesting View of the Nature and History of

Paper-Making,

PRINTING AND BOOKBINDING:

Being designed to unite Entertainment with Information concerning those Arts, with which the Cause of Literature is peculiarly connected:

Embellished with three Engravings.

SUSSEX PRESS, LEWES:

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PREFACE.

THE object of the Editor of this little book is to combine instruction with entertainment. The subjects which he has chosen, it is presumed, are interesting. It has been his aim to satisfy a laudable curiosity by pointing out the origin, progress, and nature of those arts which are intimately connected with the cause of literature; and whilst it has been his aim to communicate useful information, he has endeavoured to do it in such a manner, as to prevent it, he trusts, from becoming

tedious and forbidding. Dry details which would have only disgusted his young readers, he has, as much as possible, carefully avoided. He concludes, with observing, that he flatters himself, that what he has here collected into a small compass, will be found both pleasing and profitable to those who peruse it.

ON THE

Manufactory of Paper.

IN the first ages men used stones, bricks, leaves, and the exterior and interior bark of trees, plates of lead, wood, wax, and ivory, as the instruments of conveying their thoughts to each other.

Paper, the important medium of knowledge and literature is a word derived from Papyrus, the name of

that celebrated Egyptian plant which was used by the ancients for the purposes of writing. The Papyrus seems to have been in use before the time of Alexander the Great. According to Pliny, the following was the method of making this paper in Egypt. The Egyptians divided with a kind of needle the stem of the Papyrus into thin plates, or slender pellicles, each of them as large as the plant would allow. As they were separated from the reed, they were extended on a table, and laid across each other at right angles. In this state they were moistened by the water of the Nile, and while wet were put under a press, and afterwards exposed to the rays of the sun.

The Papyrus was an important branch of commerce to the Egyptians. It was sent to Rome, and the Roman artists by their invention and industry, added much to its excellence and beauty. They improved it by the operation of the hammer and the press, as well as by polishing it with ivory.

The Egyptians were not wholly ignorant of the use of size in making paper; but the Romans, it seems, made a stronger size. Great pains were taken to give strength to the paper of Egypt; the leaves, however, even when collected into a book, were too weak to support themselves; on which account, it was usual after every five leaves to place a leaf of parchment.

Different opinions have existed respecting the period when the Egyptian paper came into disuse. On the one hand, it has been asserted, that many of the Popish Bulls were written on the Papyrus in the 11th century. On the other side, it has been maintained, that this paper was not in use in the 5th century. Perhaps, however, it was used by some particular persons on some particular occasions for several hundred years after it ceased to be of general use. Upon the whole, it seems probable, that it was used long after the 5th century, since it does not appear that paper made from cotton was invented till the latter end of the 9th century, or the beginning of the 10th, which is sup-

posed to have destroyed the manufacture of the Egyptian paper. It is likely, however, that this was introduced by degrees. The manufacture of this paper, it is said, has flourished in the Levant for many ages; it is very white, very strong, and of fine grain. Perhaps some of the paper was made of the inner bark of certain trees before the general adoption of that which was manufactured from cotton. The trees which were commonly used by the ancients for this purpose were the Maple, the Plane tree, the Elm, the Beech, the Mulberry, and most frequently the Lindin tree. The inner coat was used after it was separated from the bark beaten, and dried.

Paper was made in China from vegetables reduced to stuff long before it was in Europe, and the Chinese have excelled in the manufactory of paper. In China, indeed, the paper varies according to the different materials of which it is composed; some is made of linen rags, some of young bamboo, some of the interior bark of the mulberry tree, some of a tree called Chu, or Kochu, and another sort of the skin which is found in the webs of the silk-worm. In India a very fine writing paper is made of rice.

Before we proceed to a particular notice of the manufacture of paper from linen rags, it may be proper just to mention that paper has been

made of a fossil called Asbestos, which is a fibrous substance of little strength but which has the peculiar property of supporting the action of fire without being injured by it. The Asbestos, for the purpose of fabricating paper, is pounded in a mortar of stone, till it be reduced to a substance like cotton. The earthy or stony particles of the Asbestos are removed by means of a fine sieve, and it is made into sheets of paper, by a common paper-mill. The writing on paper of this kind disappears, when it is thrown into the fire. Paper made of this substance, it has been observed, is more an object of curiosity than of use, as it is so very thin, that it is easily torn.

Paper manufactured throughout Europe from linen rags is thought to have been entirely unknown to the ancients and to be comparatively speaking a modern invention. It is not very easy to determine exactly the time and place when and where it was first invented. The epocha of the invention indeed seems to have been quite involved in obscurity till the year 1762, when M. Meerman proposed a reward to the person who could procure the most ancient manuscript written on paper so manufactured. From the collection of memoirs sent to him along with the manuscripts, which was published at the Hague, in 1767, it appeared that this paper had been used in Europe before the year 1300.

It is supposed that the Spaniards first used linen rags for the purpose of making paper, and that the most ancient paper of this kind is of Valencia and Catalonia. From Spain it appears to have passed into France about the year 1260, and it is discovered to have been in Germany in 1312.

A paper-mill near the town of Dartford in Kent has been considered as the first of the kind which was erected in this kingdom. John Spilman, a person of German extraction erected it in the reign of Queen Elizabeth, who granted him a licence during ten years for the sole gathering of all rags &c. necessary for the manufactory of

writing paper. It has, however been questioned whether this was the first paper mill in England, for it is said, that paper used in a book printed as far back as the year 1494 was made by John Tate, jun. of Hertford.

Having briefly mentioned the different materials which have been used for the purposes of writing, or given a concise historical account of paper, we now propose to present our young readers with a familiar description of the manufactory of paper from linen rags. The coarse brown paper which is used for packages, it may be observed, is made of oakum, i. e. of old hempen ropes; and a method has been discovered of making white paper of the

coarsest brown rags, and likewise of dyed cottons. This is done by means of manganese a kind of mineral mixed with oil of vitriol. When the materials are formed into a pulp in the manner which we shall presently describe, the paper maker causes the mixture of the above ingredients to pass through it, while it is in water, which is necessary to prevent it from burning the stuff, and it immediately discharges the colours and gives the brown a beautiful whiteness. Paper too made of brown rags is said to be more valuable on account of its being very strong and similar to parchment.

Paper, the manufactory of which we are about to describe is made

chiefly of linen rags, which are col lected from various places. These are sorted by women according to their different degrees of fineness, and with a knife or hook, they cut out all the seams which are thrown aside for other purposes. The rags are then put into the dusting engine which is a large wire sieve of a cylindrical form. This is put in motion. and by the rapidity of its motion, it separates the dust from them which passes through the wire. The next thing is to reduce the rags to pulp. Formerly they were beaten to pieces with very large hammers which made a most tremendous noise, but now they use an engine consisting of a cylindrical piece of solid wood, into which are fastened a

great many iron spikes standing very close together; and this cylinder is placed in a cistern or large trough, into which clear spring water is constantly flowing. At the bottom of the trough, there are also similar rows of sharp iron spikes. The cylinder which is carried round with very great velocity, by means of these iron teeth, and the constant circulation of the water through the cistern soon reduces the rags to a fine pulp; and in this way also is the pulp cleansed from all impurity, the dirty water passing away through a wire grating which prevents the pulp from going with it. The whole of this operation takes up about six hours. To improve the colour of the paper, a little smalt

is used which gives it a blueish hue.

When the stuff is prepared, as we have described, it is then put into the vat, which is made of wood lined with lead. The vat being furnished with a sufficient quantity of warm water as well as of stuff, two instruments are used to mix them, the one of which is a simple pole, and the other a pole with a piece of board fastened to it rounded, and full of holes. These instruments are employed as often as the stuff falls to the bottom. In the principal paper-mills, however, in England, a machine within the vat called a hog is used, which by means of a small wheel on the outside, is

continually turning round, and thus keeps the stuff in perpetual motion.

When the rags are reduced to pulp by the engine, the substance of the paper is made, but the *form* is required; for this purpose a mould is used which is made of brass wire and a moveable frame. It is the impression of the wire which occasions that appearance of white lines which we frequently see; but in order to prevent these lines, some moulds of brass wire exceedingly fine and woven, or latticed one within another have been adopted, the marks made by them being easily pressed out, so as scarcely to be visible. The workman takes a mould, of the size of the paper

which is to be made furnished with its frame and plunges it obliquely into the vat four or five inches, then raising it to a level and gently shaking the form, or mould, by means of the frame he retains as much of the pulp as is required for the thickness of the sheet: and the superfluity goes over it, whilst the water passes through the interstices of the wires. He next having placed the mould on a piece of board, takes off the frame and glides the mould towards the coucher who turns out the sheet upon a piece of felt, or woollen cloth laid on a board fixed on the edge of the vat and full of holes, and this sheet he covers with another piece of felt. He then returns the mould to the maker, who by this time

has upon another mould, prepared a second sheet, and thus the operation is continued, laying alternately a sheet and a felt till six quires of paper are made, which are called a post.

When the post is completed the workmen take the sheets to a large screw press moved by a long lever and thus the water is squeezed out of them. After this operation the sheets are separated from the felts and laid in heaps. The paper is next taken, after being parted and pressed several times, to the loft, and by means of an instrument in the form of a T is hung up for a week or ten days upon lines to dry; here it receives a fresh addition to its whiteness. If any knots are

perceived upon it, they are carefully picked off by the women who are employed in the manufactory. It is then rubbed with the hand and sized. The size is a kind of glue made of vellum shavings, or parchment boiled in water and mixed with allum. This is done to prevent the ink from sinking when the paper is used. Without such a preparation the ink would run, as it does in blotting, or grey paper. The sheets are just dipped into the size, and taken out again immediately. There is some degree of nicety in sizing the paper properly, which can only be acquired by experience. After the sheets are sized they are parted by women and again hung up in the loft; and when dry,

they are taken into the finishing room where they are examined, pressed, folded, made up into quires and reams.

ON PRINTING.

Its Origin.

PRINTING, or letter-press printing, the subject which we now propose to consider, is that art by which ideas are communicated to mankind through the medium of an *impression* on paper. and not by the *pen.* To this art are we indebted for a great improvement in other arts—for the revival of literature—and for the progress of knowledge in general.

It has been a question much agitated, *where* and *when* was the art of printing first invented. With respect to the *time*, however, it seems to be pretty generally agreed, that it could not have been invented earlier than about the year 1422, or later than the year 1442. With respect to place, we may observe that several towns have laid claim to the honour of having invented this noble and useful art, viz: Haerlem, Mentz, Strasburg, and Venice. In regard to some of these places, it has also been a matter of dispute, what particular person was the author of it. Laurens Koster is the person, whose name is connected with Haerlem. At Mentz the contest has been between J. Gutten-

berg or Geinfleische and others and at Strasburg between Guttenberg and Mentilius, while those who advocated the cause of Venice, ascribed the art to Nicolas Janson or Johnson, but they have been obliged to give it up on account of the superior claims of the other places, since it has been discovered that several books were printed before the year 1461, which is the time when the earliest work of Johnson is dated. At first view it will appear surprizing, that the origin of an art of so important a nature, and which has contributed to preserve the memory of events of much less consequence should be involved in so much obscurity. The following observations will, however, in some

measure remove the difficulty. It should be considered that this art was in a very imperfect state, while it continued under the direction of its inventor.—It was also originally used not only as a *substitute* for MSS but likewise as a *counterfeit*. The works which were first printed, were sold at a very high price as MSS.; and the persons concerned endeavoured to form the types so as to imitate the writing of the most celebrated scribes. In the next place, it should be observed, that the subject has been attended with difficulty in consequence of many persons confounding *improvements* in the art with the *origin* or *invention* of the art. And, farther some difficulties attending the rise and progress of this

art may be imputed to the number of persons who were engaged in it. Those who were of an ingenious turn, and had not sufficient funds to carry on the business, were induced to connect themselves with men of property; consequently their names were blended together, and it became a matter of uncertainty to whom the merit belonged.

Ulricus Zell in the annals of Cologne between 1470 and 1500, observes that *metal* types were invented at Mentz, but asserts that printing was introduced into Mentz by the imitation of a book entitled Gramatica Donati which had before been printed in Holland. Mariangelius Accursius

who flourished from 1500 to 1560, wrote on a blank leaf of a Donatus which had been published in the year 1450, that "Peter Schoeffer had invented brass types and greatly improved printing, but that he took the first idea from a Donatus printed in Holland with letters cut in wood. We have also the testimony of Zurenus junior who was born in the year 1517, and was sheriff of Haerlem in 1549, to the same effect, as appears by fragments of his dialogues concerning the invention of printing which were collected by Scriverius. In these he attributes the honour of the invention to Haerlem but acknowledges that it was much improved at Mentz. Ludovicum Guicciardini, a

celebrated Italian, who published the History of Holland, in the year 1565, mentions Haerlem as the first place where printing was first practised. D. V. Coornhert who erected a printing press at Haerlem, in the year 1560, mentions it as a well known fact, that the art originated in that city which was conveyed in a surreptitious manner to Mentz, where it was advanced to a great degree of perfection. But the most consistent and satisfactory account of the invention of printing is that recorded by Hadrianus Junius, the celebrated historian of Holland. This writer, we are informed was born at Hoorn, in North Holland, in the year 1512, was educated at Haerlem, was Rector of the Latin School and Teach-

er of Natural Philosophy in that city for several years; and he died in Zealand in 1575. His history of Holland was written in elegant Latin, and he was considered as an impartial and upright man. His work was published after his death in the year 1578. In his account of the city of Haerlem he mentions the following particulars in reference to the invention of printing. "About one hundred and twenty years ago, one Laurens Janssen Koster inhabited a decent and fashionable house in the city of Haerlem situated on the market-place, opposite the royal palace." This is now the Town House. "The name of Koster was assumed and inherited from his ancestors who had long enjoyed

the honourable and lucrative office of Koster (or sexton) to the church" Sexton approaches the nearest in office to Koster, but is far distinct in dignity as well as profit. "This man deserves to be restored to the honour of being the first inventor of printing, of which he has been unjustly deprived by others, who have enjoyed the praises due to him alone. As he was walking in the wood contiguous to the city which was the custom of the richer citizens and men of leisure in the afternoons, and on holidays, he began to cut out letters on the bark of the beech tree" (or more probably formed letters from a piece of the inner part of the wood cut for the purpose) "With these letters he enstamped

marks upon paper in a contrary direction in the manner of a seal, until at length he formed a few lines for his own amusement, and for the use of the children of his brother-in-law (or as some say of his daughter's children) This succeeding so well, he attempted greater things; and being a man of genius and reflection, he invented with the aid of his brother in-law, (or according to others, his son in law) Thos. Pieterison, a thicker and more adhesive ink, as the common ink was too thin and made blotted marks. With this ink he was able to print blocks and figures to which he added letters. I have seen specimens of his printing in this manner. In the beginning he printed on one side only.

This was a Dutch book, the author unknown. It was entitled *Spegel enser Behoudenisse.* That it was one of the first books printed after the invention of the art, appears from the leaves which are pasted together, that the naked sides might not be offensive to the eye; and none at first were printed in a more perfect manner. As this new species of traffic attracted numerous customers, thus did the profit arising from it increase his love for the art, and his diligence in the exercise of it. He engaged workmen which was the source of the mischief. Among those workmen was one *Jan*; whether his surname was Faust or any other, is of no great importance to me, as I will not dis-

turb the dead, whose consciences must have smitten them sufficiently while living. This Jew who assisted at the printing office under oath, after he had learned to set the letters, to cast the types, and do other things belonging to the art, and thought himself sufficiently instructed, having watched the opportunity, and as he could not find a better, packed up the types and the other articles on Christmas eve, while the family was engaged in celebrating the festival, and stole away with them. He first fled to Amsterdam, thence to Cologne until he could establish himself at Mentz, as a secure place, where he might open shop, and reap the fruits of his knavery. It is a known fact that within

the twelve months, that is, in the year 1440, he published the *Alexandri Gadli Doctrinale*, a grammar at that time in high repute with *Petri Hispani tractatibus logicis*, with the same letters that Laurens had used. These were the first products of his press. These are the principal circumstances that I have collected from creditable persons far advanced in years, which they have transmitted like a flaming torch from hand to hand. I have also met with others who have confirmed the same," &c.

Hadrianus Junius after giving the preceding narrative mentions what Nicolas Gael, his schoolmaster, used to repeat concerning the indignation

which Cornelis the book-binder, who assisted at the printing office of Laurens manifested, while he related the particulars of the theft; and he confirms his narrative by the testimony of the Burgo-master Quirinus Talesius which was this, that he also had heard the book-binder express himself in a similar manner.

It is proper to remark, that there is *internal evidence* of the justness of the claims of Haerlem to the *invention* of printing. Several copies of the *Spiegal de Behoudenisse*, which is one of the first books from the Haerlem press, are still extant; and their appearance is such as to accord with what has been asserted respecting the

rudeness of printing, when in its infancy. Mr. Meerman in his *Origines Typograph.* has given not only an accurate imitation of the first page of that curious book, but also specimens of the progressive improvements which were made in the press at Haerlem in subsequent editions of that work, and in other publications. To these he has prefixed curious specimens of the first Essays made by Koster in a little book, which was evidently composed for the use of children. They consist of the Alphabet, the Lord's prayer, the Creed, and two or three other Prayers.

The exact period, when printing was invented by Laurens is not abso-

lutely certain, but from circumstantial evidence, it appears, that the first idea must have been suggested to him about the year 1428 or 1430. This conjecture is strengthened by the state of printing at Haerlem in 1440. An edition of *Donatus* and the Latin of the *Spiegal* under the title of *Speculum Salutis* published in that year, evince improvements so great, considering the many difficulties which they had to overcome that several years must have been necessary to arrive at such a state of excellence. Several foreigners mention an edition of Donatus printed in Holland before that which was published at Mentz, and assert that the Dutch edition served as a model for the other; but the

Dutch not having been able to produce the work to confirm the assertions which had been made, satisfied themselves with this general remark, that when the art of printing was risen to a considerable state of excellence, the first and more imperfect editions of books were used as waste paper. Now this conjecture seems to be well founded, for Seiz who published his treatise on the art in the year 1740, says: "As this last sheet concerning Haerlem, was going to be printed off, John Enschedi having purchased some books at a public sale, bought a Dutch Psalter, in small 8vo, printed by H. E. Van Homberch in the year 1498 at Delft in Holland. It was bound in leather according to the oldest fashion.

Perceiving that the binding was made fast to the paper within by means of two slips of parchment that were glued between them, and that something was printed upon this in a very old character, he detached the slips and found to his great surprise, that they were fragments of a *Grammatica Donati*.

No solid objections have been advanced against the narrative of the robbery committed by one of the servants of Laurens as recorded by Junius. It is by no means incredible that every thing which was absolutely necessary could be carried away by stealth. It should be remembered that the servant was practically acquainted with the business, that

he, no doubt, could bear in his mind a perfect model of the printing apparatus and that he could easily take with him some of the moveable wooden types which had been used at Haerlem. It may not be amiss just to observe that Junius seems not to have known who the person was that committed the theft, and that he was mistaken respecting the early use of metal types at the Haerlem press, as there is no satisfactory evidence that Haerlem was in possession of metal types before the year 1472.

The person who most probably stole the types, &c. from Laurens at Haerlem was John Geinsfleische, sen. and he is supposed to have committed the robbery about the year 1439 and to have

established himself at Mentz in 1440, or 1441. He was brother to Geinsfleische, jun. commonly distinguished by the name of Guttenberg, who endeavoured to set up a printing press at Strasburg two or three years before, but who from the imperfection of his knowledge of the art united perhaps with other circumstances did not succeed. It seems most reasonable to conclude that what knowledge the younger brother had of printing he derived from Geinsfleische, sen. during the residence of the latter at Haerlem. If Guttenberg had succeeded at Strasburg, it is most likely, Geinsfleische would have left his master and united with his brother there; but the scheme did not answer.

From the authentic documents of a legal process at Strasburg which occurred in the year 1438, we learn the following particulars respecting Guttenberg. It appears that he was a native of Strasburg, that he was an ingenious man, and that he had engaged to instruct one Andrew Drizehen, or Drizehenius in the art of polishing stones. At a subsequent period he also engaged with one John Riff in the art of making mirrors or looking glasses, as practised at Aix la Chapelle and likewise in some other arts, a knowledge of which Drizehen and Anthony Heilman wished to acquire. Certain conditions were proposed and settled between them. Upon an accidental visit to Guttenberg who re-

sided in the suburbs of Strasburg, these two perceived that Guttenberg was busily employed in another mystery which had been carefully concealed from them. After a few reproaches on their part, he proposed, on certain conditions, to instruct them also in this. One of the conditions was, that a portion of the sum advanced by the parties who were to be instructed in the art, should be refunded to their heirs, if any of them should die within the space of five years. Drizehen died within the term. His heirs insisted upon the conditions of the engagement being fulfilled, with which, Guttenberg who is represented as a litigious man refused to comply. A process

was the result of this altercation From the evidence given by the different workmen, carpenters, servants, &c. it was apparent, that this mystery consisted in erecting a printing press. As soon as Drizehen was dead, orders were immediately given by Guttenberg to his servants to remove as secretly as possible some implements which, upon full examination, appeared to be a printing press with a certain quantity of letters cut in wood. This discovery was made the 26th of Dec. 1438,

A declaration afterwards made by one John Dunnius before the magistrates in 1439, that he had received one hundred florins about three years

previous to that time, for work done at a press brings the date of the first attempt to the year 1436.

Drizehen, it is evident from a declaration made to his confessor, did not get reimbursed in the least degree for the expence which he incurred in endeavouring, in connexion with Guttenberg, to erect and establish a priuting press at Strasburg; and it seems that Guttenberg himself who persisted for a considerable time in his attempts to accomplish his object, completely failed, and when he left the city, was obliged to sell every thing which he possessed. It does not appear that he left Strasburg before the year 1444, when he went to Mentz, where

his brother Geinsfleische had previously established a press. Here we shall leave the history of Guttenberg, that we may proceed with that of his brother.

Geinsfleische, when he was settled in the city of Mentz, published as Junius remarks, the *Alexandri Galli Doctrinale* and *Petri Hespani tractatus* with the very types which originally belonged to Laurens Koster, or perhaps with those and the addition of some cut after the model of the types which he had stolen. Geinsfleische finding that the sale of these works was so considerable, as to answer his purpose, was encouraged to undertake other

publications. For these he prepared types, but being involved in difficulties on account of the magnitude of his undertaking and the expen necessarily incurred he revealed the secret of the invention to Faustus, (frequently called Faust, or Fust.) As he was an opulent man, he advanced the sum required and shared in the profits with Geiusfleische.

Geinsfleische having experienced much inconvenience from *wooden* types, determined if possible, to cut them out in *metal*; and succeeding in his attempts, he and Faustus undertook to print a large and elegant edition of the Bible in 2 Voulmes folio. This was publisned in 1450,

was sold for elegant manuscript and dispersed over Europe at a very high price. Eight years, it is supposed, were employed in preparing for and executing this great performance. The partners had altercations respecting the expence incurred. A law suit followed which was decided against Geinsfleische, and the partnership was dissolved in 1455. Thus the secret was made known. Two printing offices were established, and became rivals to each other.

In the year 1457, Faustus published a *Psalter*, and openly acknowledged that it was executed not with the *pen* but by an *impression*, or *printing*. In the mean time Geins-

fleische connected himself with his brother Guttenberg, who had probably been employed in an inferior capacity, whilst Geinsfleische and Faustus, were in partnership. These brothers cut the types in a very superior manner and excelled Faustus as appears from their publications in the year 1460. Faustus, however, took into his service one Peter Schoeffer de Gernsheim, a young man of great ingenuity, who invented the method of casting metal types from matrices which he cut; thus, much time and expence were saved as well as an addition made to the elegance of their work, so that in consequence of this invention, they exceeded their opponents. Faustus was so highly delight-

ed with this improvement, that as a reward to Schoeffer for his ingenuity, he gave him his only daughter Christina in marriage.

Faustus and Schoeffer, by administering an oath of secrecy to all whom they entrusted, confined this improvement to their own office till the year 1462, when by the dispersion of their servants into different countries at the sacking of Mentz by the Archbishop Adolphus, the invention being publicly known, and made rapid progress through various parts of Europe; and among different places, it was then carried on with success by Mentilius and others at Strasburg.

Before the year 1465, the uniform character used in printing was the old gothic or German, from whence our black was afterwards formed. But in that year an edition of Lactantius was printed in a kind of Semi gothic character which was exceedingly elegant, and very similar to the present Roman type, which last, was first used at Rome in 1467, and soon after brought to great perfection, particularly by Janson.

It must have been evident to our readers, that we have attributed the *origin* of the noble and important art of printing to Haerlem—the *improvement* to Mentz.

There is something very natural in the account given of the invention by Koster; and there is nothing incredible in supposing that one of his servants surreptitiously conveyed the art from Holland to Germany. Moreover, it is highly improbable that different persons at distant places should, quite independent of each other, have invented it at the same time. It is admitted indeed that circumstances did exist which seemed calculated to suggest an idea of it to the mind of a contemplative person, and one desirous of the intellectual improvement of the human race. *Engraving* had been practised long before. The manner of making impressions by *seals* bore some analogy to it, and

also the mode formerly practised by the Grand Sultan, of literally setting his hand to an edict by making an impression of his whole hand dipped in ink, " yet (as it has been justly remarked) as so many ages had passed without the idea of modern printing having been suggested by either of the modes so analogous, the probability is as millions to one against the idea, being suggested to two different persons at distant places at the same time."

In order to remove any difficulty which may arise in the mind against the idea that Haerlem was the place, where the art of printing originated, because that it was long the general

opinion of Europe, that the first printing press was established in Germany, it may be proper to observe, that whilst Laurens and his successors principally published works, which had only a *local* popularity, Mentz issued forth such works as were interesting to foreigners and to the literati in general, works in the Latin language, which has been denominated "the living tongue of the learned" Beautiful editions of the Classics, as well as copies of the Bible attracted the attention of persons far and near. Considering these circumstances and others which might be mentioned, it is no wonder, that Haerlem has been deprived of the honour arising from its being the spot, where this most benefi-

cial art commenced. Beneficial we may justly pronounce it to be, and may exclaim in the language of the Poet.

Aided by thee—O Art sublime! our race
Spurns the opposing bonds of time and space,
With Fame's swift flight to hold an equal course,
And taste the stream from Reason's purest source;
Vice and her hydra sons, thy powers combin'd,
And cast in Virtue's mould the plastic mind.

M'CREERY.

Introduction of the Art of Printing into England.

SOME difficulties and disputes have existed respecting the introduction of

the art of printing into England, similar to those which have prevailed respecting the origin of it in other countries. As the invention of printing at Haerlem with *wooden types* has been by many persons unnoticed, whilst the honour has been ascribed to Mentz, because there *metal* types were first used, so the person who first printed in England at Oxford with *wooden types*, has been overlooked, whilst Caxton who first printed with *metal types* at Westminster. has been mentioned as the original artist.

William Caxton served an apprenticeship to one Robert Large, a mercer, who, after having been sheriff and

lord mayor of London, died in 1441, and left him thirty-four marks which was a considerable legacy in those times. From the period of his master's death he spent the following thirty years as a merchant abroad, where in 1464, it appears, that he was employed by Edward IV. in a public and honourable negociation jointly with one Richard Whitehill, Esq. to transact and conclude a treaty of commerce between the king and his brother-in-law, the Duke of Burgundy, to whom Flanders belonged. He lived many years in the court of the Duchess of Burgundy, to whom as well as to Edward IV. and his brother the Duke of Clarence, some of his works are addressed. He also printed

for Henry VII. and his son Prince Arthur.

It was for a long time maintained that printing was first introduced into England and practised here by Caxton—that this person, in consequence of his travels abroad and residence for many years in Holland, Flanders, and Germany, had an opportunity of obtaining information respecting the nature and process of the art—and that by the patronage of the great, and particularly of the Abbot of Westminster, he first set up a press in the Abbey, and began to print books soon after the year 1471. This was a prevalent opinion, till a book which had scarcely been noticed before the Res-

bration, excited the attention of the curious. It was dated from Oxford, A. D. 1468. When this was examined, it was deemed a satisfactory evidence, that printing was exercised in that University some years before Caxton erected a press in Westminster Abbey.

The book to which we refer, is in the public library at Cambridge; and is a small volume of 41 leaves in 4to with this title: "Expositio Sancti Jeronimi in Simbolum Apostolorum ad Papam Laurentium": and at the end "Explicit expositio &c. Impressa Oxonie, et finita, Anno Domini MCCCC LXVIII, XVII die Decembris".

Since the appearance of this book, Caxton has been deprived of the honour of being represented as the person who first printed in England, and Oxford has been considered as the place where the art was first practised. The silence of history, however, concerning so remarkable an occurrence was deemed extraordinary—the want of any memorial even in the University, of the establishment of so important an art among us was thought to be a difficulty. But the obscurity in which the affair was involved has been cleared up by the discovery of a record which had lain neglected, or unknown at Lambeth house in the register of the See of Canterbury. This gives a narrative of the whole

transaction drawn up at the very time. An account of this record was first published in a thin quarto volume in English, with the title —" The Original and Growth of Printing, collected out of History and the Records of this Kingdom: wherein it is demonstrated, that printing appertaineth to the Prerogative Royal; and is a Flower of the Crown of England, by Richard Atkyns, Esq. —Whitehall, April 25, 1664". 4to. This shews that as soon as the art of printing excited attention in Europe, Thomas Bourchier, Archbishop of Canterbury urged the king, Henry VI. to use all possible means for procuring a printing mould (for so it was then called) to be brought into the king-

dom. The king listened to the proposal, and taking private advice how to carry the design into effect, concluded, that it could not be accomplished without great secrecy, and a considerable sum of money, to enable the person or persons employed to draw off some of the workmen from Haerlem in Holland. One Thousand marks were deemed necessary, towards which sum the Archbishop contributed three hundred. The money being provided, Mr. Robert Turnour, who was then master of the robes, and highly in favour with the king, was intrusted with the management of the design. Mr. Turnour took with him Mr. Caxton, who trading much in Holland, had a

creditable pretence not only for going into the low countries, but for his continuance there. Mr Turnour was in disguise with his beard and head shaven; but Mr. Caxton appeared known and public. Having received the thousand marks, they went first to Amsterdam, then to Leyden, being afraid to enter Haerlem itself, as the town had shewn its jealousy, by apprehending and imprisoning several persons who came from other parts with the same design. When the thousand marks were expended, the king sent them five hundred more. Turnour engaged the assistance of two Hollanders in bringing off Frederic Corsellis, an under workman at the Haerlem press, who late one

night stole from his comrades in disguise, and entering a vessel prepared for his reception, sailed immediately with a fair wind. It not being judged prudent to set him to work in London, he was sent to Oxford, by means of the Archbishop, who had been Vice-chancellor and afterwards Chancellor of that University; and he was conducted thither by a guard to prevent his escape before he had performed his contract.

As inconveniences were found connected with the circumstance of the Oxford press being so far distant from London, the king had a press established at St Alban's and another in the city of Westminster, where

books of divinity and physic were printed.

Some eminent writers, on the authority of the record at Lambeth have declared that Corsellis was the first printer in England. But it has been objected that this record "was never heard of before the publication of Atkyns's book, and that it has not ever since been seen, or produced by any man, though the registers of Canterbury have been diligently and particularly searched for it." In reply, it has been observed, that it is not probable, that Atkyns would forge a record to be laid before the king and council, which his adversaries could disprove, he being at that time engaged in an expensive lawsuit with the Company

of Stationers, in defence of the king's patents, under which he claimed some exclusive powers of printing—Besides it is said, John Bagford in his History of Printing at Oxford, asserts that he knew that Sir John Birkenhead had an authentic copy of it in 1665 (by mistake he calls it 1664) when Sir J. Birkenhead was appointed by the House of Commons to draw up a bill relative to the exercise of that art. This was confirmed by the Journals of that house, Friday, Oct. 27, 1665, vol. VIII. p. 622, where it ordered that this Sir John Birkenhead should carry the bill on that subject to the House of Lords for their consent. The act was agreed to in the upper house on Tuesday, Oct. 31, and re-

ceived the royal assent on the same day; immediately after which the parliament was prorogued. It has been thought probable, that after Mr. Atkyns had published his book in 1664, the parliament considered it proper the next year to enquire into the right of the King's prerogative—and that Sir John Birkenhead inspected the original then in the custody of Archbishop Sheldon—but finding it insufficient to prove the point, for which Mr. Atkyns had cited it, made no report of the manuscript to the house, and only moved that the former law should be renewed. The manuscript, it is supposed, was never returned to the proper keeper of it, but was afterwards burnt in the fire of London Sept. 13, 1666.

The opinion that printing was practised at Oxford, seems to have prevailed long before Atkyns published his book. Bryan Twyne, in his Apologia pro Antiquitate, Academiæ Oxoniensis, published 1608, says: "It is so delivered down in *ancient writings*," alluding probably to the Lambeth M.S. King Charles I. also in his letters patent to the University of Oxford, March 5, 1635, mentions printing as introduced to Oxford from abroad.

Corsellis might print some works without date or name of place, or the civil wars, which broke out in 1469, might render it necessary for him to be inactive as a Printer for some time.

But supposing that he did pursue his business from 1468 to 1479, yet it may be observed, that only a few books and a few copies of those books were printed in those days of ignorance. Besides, when the same books were printed in a superior manner, the first editions not being then considered as curiosities, might be used for common purposes.

The celebrated J. Leland, library keeper to Henry VIII. and others, calls Caxton "the first printer of England." This, however, may be accounted for from his being the first who exercised the art with *fusile types*, and who thus greatly improved

it; yet Corsellis might print at Oxford at an earlier period with *separate cut types in wood*, which was the plan he had learnt at Haerlem.

The first book which Caxton seems to have printed in this country, was in 1474. It was a translation from the French of a work "On the Game and Play of the Chesse."

Caxton was an historian, as well as a translator and a printer. He lived to be old; probably he was more than fourscore at the time of his death. In the year 1471, he complained of "the infirmities of age creeping upon him, and enfeebling his body;" yet he followed his business

for a long time after that period, till 1491, in which year he died.

Since the days of Caxton, printing has been carried on to a very great extent; and this noble art has been much improved. Baskerville was the person who first introduced fine printing. His type was peculiarly elegant and the ink which he used was extremely favourable for exhibiting the beauty of the type. Others have proceeded in the steps of Baskerville, knowing the celebrity which he acquired, and prompted by the spirit of emulation. Amongst those of the present age, the names of Bensley and Bulmer stand foremost, "from whose press have issued some of the

finest specimens of typography that are to be found in this country, or in Europe."

Truly honourable and useful is the profession, to which these gentlemen have devoted much of their time. It is

"The meteor beam that science lent mankind,
Darting effulgence on the inquiring mind."
M'CREERY.

On the Manner in which Printing is performed.

Having already treated concerning the origin of the art of Printing on the continent, and its introduction into Great Britain, we now propose to give a concise but clear account of

the manner in which the art is practised.

The persons employed in printing are of two classes --Compositors, who range and form the letters into words, lines, pages, &c. according to the copy which they receive from the author—and Pressmen, who apply ink to the same, and take off the impression. The types being cast, the compositor distributes each kind by itself among the divisions of two wooden frames, an upper and a lower one, called cases, which distribution is denominated *laying the cases*. Each of these is divided into little cells. These of the upper case are 98 in number; and they are all of the same size. In them the

capitals, small capitals, accented letters, figures, &c. are disposed, the capitals being placed in alphabetical order. In the cells of the lower case, which are 54, the small letters are placed with the points, spaces, &c. These cells are of different sizes, the largest containing the letters most used; they are not in alphabetical order, but the cells which contain the letters most frequently wanted are nearest the compositor's hand. Each case is fixed a little aslant, that the compositor may more conveniently reach the upper cells.

When a line is composed, if it end with a word or syllable there will be no occasion for any different arrangement;

otherwise more space must be put in, or the distances be lessened between the several words, so as to make every line end even. The spaces are pieces of metal shaped exactly like shanks of the letters. They are of various thicknesses; their use is to support the letters, and to preserve a proper distance between the words: because they do not reach so high as the letters, they make no impression, when the work is printed. As soon as the first line is finished, the compositor proceeds to the next; he therefore moves the setting rule which is made of brass, from behind the former and brings it before it, and so composes another line against it in the same manner as he did the first; and he goes on

till his composing-stick is full, when he empties all the lines that it contains into a gally, which is a flat piece of board with a ledge at the bottom and another at the end towards the right hand.

The Compositor thus pursues his business till he has formed a complete page, when he ties it up with a cord or packthread; then setting it by, he proceeds with the work, till the number of pages to be contained in a sheet, is completed; and when completed he carries them to the imposing stone, there to be ranged in order, and fastened together in a frame called a chase. This is termed imposing. The chase is a rectangular iron frame of

different dimensions according to the size of the paper to be printed. It has two cross pieces of the same metal, called a long and short cross, mortised at each end, so as to be taken out occasionally.

By the different situations of these crosses, the chase is adapted for different volumes: for quartos and octavos, one traverses the middle lengthwise, the other broadwise, so as to intersect each other in the centre: for twelves and twenty fours, the short cross is removed nearer to one end of the chase: for folios, the long cross is entirely left out, and the short one is left in the middle; and for broadsides, both crosses are taken away. To

dress the chase, or properly fix the pages therein, the compositor makes use of a set of furniture, consisting of slips of wood of different dimensions, and about half an inch high, that they may be lower than the letters. Some of these are placed at the top of the pages and called head sticks; some between them to form the inner margin; others on the side of the crosses, to form the outer margin, where the paper is to be doubled; and some in the form of wedges to the sides and bottom of the pages. In this manner, the pages being placed at their proper distances, and secured from receiving injury by the chase and furniture placed about them, they are all untied, and fastened together, by dri-

ving up between the slanting side of the foot and side-sticks and the chase, with a piece of hard wood termed a shooting-stick, and a mallet, small pieces of wood called quoins, cut in the wedge form. All being thus bound fast together, so that none of the letters will fall out, the work is ready to be committed to the Press-man. In this condition it is called a form; and as two forms are required for every sheet, when both sides are to be printed, it is necessary, that the distances between the pages in each form should be placed with such nicety as that the impression of the pages in one form may be made to fall exactly on the back of the pages of the other; and this is called register.

As there must unavoidably be some mistakes in the work, either through the oversight of the compositor, or by the casual transposition of letters in the cases, a sheet is printed off which is called a proof. This is given to the corrector, who when he has read it over and rectified it by the copy, making the alterations in the margin, delivers it back to the compositor, that it may be printed with accuracy. The compositor then unlocking the form upon the imposing stone, by loosening the quoins or wedges which bound the letters together, rectifies the mistakes by picking out the faulty, or wrong letters with a slender sharp-pointed steel bodkin, and putting others into their

places. After this a second proof is made, sent to the Author and corrected as before; and then there is another proof called a revise, which is made for the purpose of seeing whether all the mistakes marked in the last proof, are corrected.

The Pressman's business is to work off the forms which have been prepared by the compositor, and in doing this, four things are necessary, paper ink, balls and a press. To fit the paper for use, it is first wetted by dipping several sheets together in water. These are afterwards laid in a heap one upon another; and to make them take the water equally, they are all pressed down with a weight at the

top. The ink is made of oil and lamp-black. The balls, by which the ink is applied to the forms, are a kind of wooden funnels with handles, the cavities of which are filled with wool; and pelt, *i. e.* a dried sheep's skin, is nailed over them, which is made exceedingly soft by soaking it in urine and rubbing it well. One of these balls, the pressman takes in each hand, and applying one of them to the ink-block, he works them together to distribute the ink equally; afterwards he blackens the form which is placed on the press, by beating with the balls upon the face of the letter.

The press which is said to be best adapted for any kind of printing, is

PRINTING.

that lately invented by Earl Stanhope, and originally made by Mr. Walker. This gives a vast accession of power with a very considerable diminution of labour. It is to be regretted, however, that the expence of the purchase, is so great as to preclude its general use. Mr. Brooke, a printer's joiner, has, however, improved the common press on the principle of the Stanhope one.

On Stereotype Printing.

BEFORE we conclude, it will be proper to take some notice of the Stereotype art: *i. e.* of the art of printing with solid or fixed types.

J. Vander Mey, a Dutchman, who resided at Leyden about the end of the 16th century seems to have invented and practised this art, but it it is probable that it died with its inventor. The next person who appears to have directed his attention to plate making, was a Mr. Ged, who began this in the year 1725. He formed different connexions in this business, but not succeeding in consequence of the opposition which he met with, he went to Edinburgh, where he had before resided. There he published, in 1736, a Stereotype edition of Sallust.

About 50 years after Mr. Ged, Mr. Tilloch the learned editor of the Philosophical Magazine, devised a scheme

of a similar nature in connexion with Mr. Foulis, printer to the University of Glasgow. They printed several English works from solid plates, and also a greek volume, Xenophon's Anabasis, 1783. Since their practice of the Stereotype art, Didot, the celebrated French printer has applied it to various publications.

It should also be observed that some years after Mr. Tilloch had declined the prosecution of this art, Mr. Wilson a respectable printer engaged with Earl Stanhope in the pursuit of it, and it appears from Mr. Wilson's account that success attended their exertions. His Lordship, it seems, received his first instructions in the art

from Mr. Tilloch, and had Mr. Foulis with him for some time at his seat at Chevening.

With respect to the Stereotype art, it is, we believe, considered by some competent judges, that it will not do for every work which is to be printed. It seems, indeed, to be adapted only for books of established reputation and extensive sale, and for such as require and admit of no alteration.

CONCLUSION.

THUS have we given a concise, but, we trust, comprehensive account of the *Art of Printing.** We have

*We take this opportunity of referring our readers for a more full account of the Art

traced its origin and progress on the Continent—and also its introduction into Great Britain.—We have described the manner, in which it is usually performed; and lastly, we have presented before our readers a brief history of the Stereotype method.

Of all the arts which engage the attention of man, surely no one is more calculated to promote truth; we therefore earnestly wish, that the li-

in all its branches, to Mr. Stower's ingenious and elegant work, entitled, "The Printer's Grammar", since it was not our design in the above essay, to present such a complete view as might be necessary to one who wishes to acquire a thorough knowledge of the art so as to practise it, but to afford such information as would be interesting to readers in general.

berty of the press may descend unimpaired to the remotest generations.

"Since truth is truth, as all allow,
It cannot suffer stinting
Pernicious error rears her brow
When tyrants limit printing".

Dr. Cogan.

ON

BOOK-BINDING.

IN our concluding Essay, we propose to consider the subject of Book-binding, which appears to follow with propriety the topics already discussed—*viz.* the arts of paper-making and printing.

Book-binding is the art of gathering and fastening together the sheets of a book and covering them with a back. In ancient times, the leaves were only glued together, and rolled upon round sticks or cylinders of wood which were

used as handles. This invention is attributed to the Egyptians; and the plan was also continued till long after the age of Augustus.

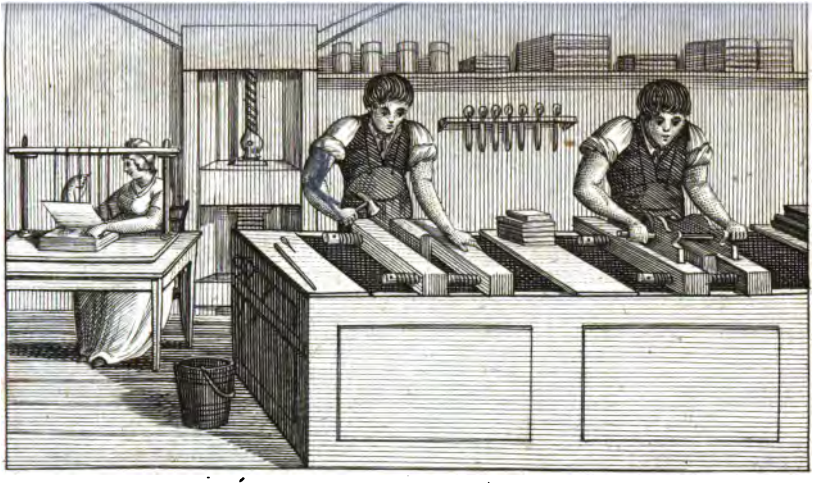
The form now in use, is said to have been invented by one of the Attali Kings of Pergamus. For the instruction and amusement of our readers, we shall endeavour to give a clear, but concise account of the general operation.

The leaves are first folded with a thin piece of ivory, or bone, called a folder, and laid upon each other in the order of the signatures, *i. e.* the letters or figures at the bottom of the pages. Next, the leaves are beaten on

a stone with a heavy hammer to make them smooth and lie close together; then they are pressed and collated, by observing that the signatures run in alphabetical order. When the back of the book is to be flat, it is sawn before it is sewed to let in the cord, but when the bands are to be raised, the book is sewed without being sawn, or glued on after the book is cut, on the first plan. The folding, sewing, and headbanding of books is generally performed by women. In sewing the sheets of a book together, a hand press is used which tightens the cord; and the sewing is accomplished by drawing a thread through the middle of each sheet round the bands, and, at the same time the waste papers are

fastened on with the needle, which are at a future period pasted on the inside of the cover. After the sewing, the book is glued at the back, and the bands are opened and scraped, that the paste-boards may be properly fixed.

The back is turned with a hammer, and the book is fixed in a press between two boards called backing boards, and hammered round, that a groove may be formed for the paste-boards which in the fore-edges are squared in the press by an instrument called a plough, that has the cutting knife affixed to it. The squares for the head and tail of the book being left till it is cut.



BOOK BINDERS.

When the paste-boards are applied, holes are made for fixing them to the book. After the bands are drawn, they are cut off nearly to the boards and beaten down with the hammer. The back of the book is then thinly glued or pasted again, and it is put into the standing-press; next it is taken to the cutting press and placed between two boards, the one lying even with the press, that the knife may run upon it, the other above the press, for the knife to run against. The paste-boards are squared, by pulling them, down before the head of the book is cut; and after it is cut, they are raised up beyond it before the tail is cut.

In cutting the fore edges, the back

of the book is made flat by a pair of wooden or iron trindles nearly resembling the form of a folder. To effect this, the trindles are placed between the boards and the back, when the trindles are taken away, the book is then fixed in the press, and cut as before. This being done, the fore-edge groove is formed together with the square edges.

The next operation is sprinkling, or gilding the leaves of the book. Sprinkling is done by dipping a brush into the liquid and putting it on fine by striking it against an iron pin. By this motion, the edges of the leaves are sprinkled in a regular manner. The liquid, into which

the brush is dipped, is made of different materials according to the colour used. When the edges are covered entirely with one colour, the liquid is applied by means of a sponge. If the leaves are to be gilt, the edges are well scraped and smoothed with a burnisher; then gold leaf is laid on with size made of the white of an egg and water; and when the edges are dry, they are again burnished to give them a bright appearance. Afterwards the book is headbanded with silk, thread, or worsted by platting it round a bit of glued cord, or paper rolled up fixed with a needle to the back. Before the book is covered, the back is lined with paper, or canvas to strengthen it.

When this is done, the cover is fastened to the pasteboards. Formerly, it was the common custom to bind all books in parchment, but parchment when used for binding is now chiefly confined to Account books. Calf, sheep, and Russia leather are principally used at the present time. If a book is to be merely half-bound, then only the back and corners have leather fixed on them and the rest is covered with marble paper.

The following is the method of fastening the cover. The leather being moistened in water, is cut out about an inch larger than the book, then pasted and placed upon the pasteboards on the outside and doubled over the

edges in the inside, the four corners being cut off with the shears. The book is then warmed at the fire, and rubbed with the folder to make the glue adhere and form the headband properly. If the book has raised bands, it is tied up between two boards at the fore-edge part with cords continued to the back, so that the bands may be more accurately formed; then the volume is dried as before mentioned, and when dry, uncorded having the leaves opened at each end.

The next process is to wash the book with a little paste and water, and then to sprinkle it fine with a brush, by striking it against an iron pin, unless it is to be marbled: if that be

done, the book is put between two rods in an oblique direction, then water is thrown coarsely with a brush, which is followed by a black liquid made of copperas and water, or steel filings boiled with vinegar. Next a brush is to be used with salt of tartar mixed with water, and lastly the book is to be wiped with a wet sponge.

When a book is lettered, most commonly a piece of Morocco leather is pasted on the back between the first and second bands to receive the title in gold letters, and sometimes a second between the next bands underneath, where the number of the volume is marked. The gilder makes the letters on the back, likewise the

roses, stars, &c. with pallets and rolls formed of brass. The parts of the leather to which the tools are to be applied are glazed with the white of an egg, and then rubbed with an oiled sponge to prevent the gold leaf, which is then laid on, from adhering to any other parts, excepting those upon which the tools make an impression.

The pieces of gold leaf are cut out nearly to the size required, and upon these the pallets and rolls are stamped according to the fancy of the workman. The superfluous gold is rubbed off with an oiled rag and afterwards cleared by a piece of flannel. After the book is gilt, the cover is polished with a polishing iron, which is made

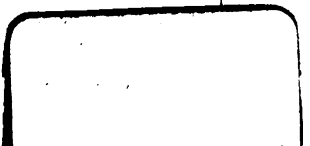
hot and passed over the cover: thus the volume is completed.*

* The above essay is not designed to teach the Art to those who mean to pursue it as their profession, but to furnish matter which may interest young persons and others, who are desirous of understanding something concerning the general operation. What is there expressed is an account of the common mode of book-binding; but it should be observed, that there are various kinds of extra and fanciful binding in Calf, Russia, and Morocco performed upon a similar plan with the greatest care and nicety of workmanship, with, or without spring backs. Vellum and parchment binding for Account books is done upon a like principle but it is sewed on parchment slips instead of having cords or bands, the back part of the covering being stiffened, to make the book open flat.

THE END.

Baxter, Printer, Lewes.

This book should be returned to the Library on or before the last date stamped below.

A fine is incurred by retaining it beyond the specified time.

Please return promptly.